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(54) **Stackable cardboard tray and method of its manufacture.**

(57) The tray comprises a base part, in the shape of a small cask, forming the bottom panel (1) of the tray with an upwardly extending peripheral flange (2) to which is attached one or more parts (3) that form the four sidewalls of the tray. Additional elements (4) may be added to the sidewalls to enhance structural stiffeners.

According to a further aspect of the invention, the plane of the bottom panel lies below the lower most edge (3a) of the sidewalls, providing a stepped portion which may be received into the open upper end of an underlying similar tray to provide a positive stacking means, the upper edge of the sidewalls (3c) of the underlying tray supporting the lower edge (3a) of the sidewalls of the overlying tray.

The bottom panel and sidewalls may be formed from differing densities of cardboard.

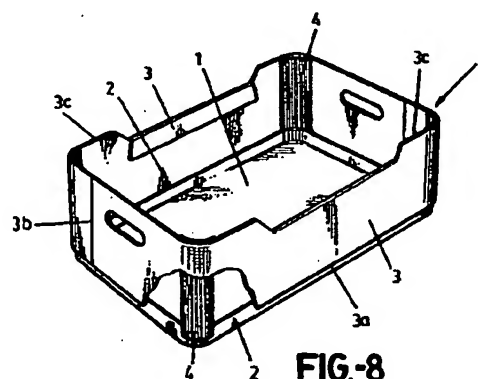


FIG-8

EP 0 573 381 A1

OBJECT OF THE INVENTION

The present invention relates to a new type of trays or pile up boxes, made of cardboard, trays intended for the transportation of the different types of perishable goods, as for example fruit, vegetables and other products alike.

The invention also concern to the procedure of the manufacture of this type of tray or boxes.

BACKGROUND OF THE INVENTION

At the time of designing a new tray of the type mentioned above, a number of conditions that assure a good level of features must be consider, and in this sense the tray must be resistant, easy to handle, to allow a good presentation of the product to be pack on it, and finally recycleable.

Relating to the first condition, that refers to the resistance, the tray must be capable of holding the weight of the product without suffering any deformation on it's bottom part, it must hold the stillness pile up, it must a high compression capacity, as a function of the weight to be hold and to the pile up number required, it must be capable of dynamic piling, meaning the vibrations and movements to which is going to be subject of, it must be capable of resisting the handling, stockage and transportation conditions, specially to the effects of the environmental humidity, that in the case of cold storage rooms on which this type of trays are place could reach the 90%.

About the second condition, it's handling, the tray must offer the possibility of being served mounted, as it is required by the small users, or as well as dismantle, as it is required by the large users, that have their own places where it is desirable the use of small machines, light and with the greater automatation possible.

Relating to the third aspect the tray must offer excellent conditions for high quality printing and finally, from the point of view of it's recyclability, it must devoid the elements that make this condition difficult as for example staples or any other non recycleable materials.

There are today in the market to basic types of boxes or pile up trays, one is the one that the wood is the raw material, and the other is the one that uses cardboard.

The trays of the first type, the ones made of wood, although they pass the first aspect that is the resistance they do not satisfy any of the other aspects priorly mentioned, because it is not easy to handle, neather offers the possibility of a high quality printing and it is not recycleable at a lower cost.

Within the second group, there are many types of well kown cardboard trays or made of any other similar material, generally form from a plate properly shape, with folding lines that define the bottom of the

tray, from which elongate the winds that, when forming the tray, will become the sides of the tray.

This type of trays show some problems for it's manufacturing, because the difficulty of the operations needed for the construction of the tray and the joining between the adjacent edges of it's sides on the corners of th tray.

Furthermore, this type of trays are not resistant enough to the compresion support that are going to be subject of when loaded with the goods and pile up.

This weakness comes from the difficulty of making the folding that show this type of tray, to do this operation, cardboard must be use, specifically undulating cardboard, that besides offering a low level of resistance is highly absorbent to humidity, what means a quickly damage of the tray.

In many cases, to reinforce the tray the method use is the placing of additional pieces, particulary place on the corners. The faces of the tray are reinforce with two flanges bend over the faces of the tray.

This procedure complicates and pull up the cost of production of the tray and, most of the cases the tray is does not gain the necessary resistance.

Another problem inherent to the conventional trays form as a one piece, focus on the fact that for the graphic printing over the mentioned trays, the entire tray must be pass through the printing machine even if the printing is very small or it must be printed on a very small zone of the tray.

DESCRIPTION OF THE INVENTION

The pile up tray the this invention present has been design and arrange in order to solve in a successfull way the problems mention before.

In order to do so and in a more specific way, the mention tray forms part of the second type metion, specifically the one that uses cardboard as a raw material, but with the particularity that instead of the common undulating cardboard used for the transportation of fruit and vegetables, uses compact cardboard, and instead of been arrange as a one piece body, is arrange from single pieces, properly glue between themselves.

Specifically arrange from a base piece, shape as a small cask, forecast to be the bottom of the tray in which a rising double marginal flange is provided and to which at least another piece is joint, piece that is part of the side walls of the tray, walls that despite the fact could be made of two or four pieces, and even of other complementary pieces that work as the support for the vertical edges.

According to an other characteristic of the invention, the mentioned small cask is place inside of the piece or pieces that form the side walls of the tray, overhanging with respect to the lower edge of the pieces that form the side walls of the tray, so that during the pile up between trays, the bottom part of each

of them is assemble to the mouth piece of the immediately lower tray.

It has been forecast that the side walls of the tray could be provided with folding flanges, that will fold towards the inside of the tray and fix by glue, intend to provide with more resistance to the mentioned tray.

The structuration of the multi-piece of the tray allow the use of pieces of different thickness, with the purpose of raising the mechanic resistance of the tray where needed.

The pieces that form the side walls of the tray, could present in it's lower edge separate notches and in it's upper edge rising wings complementary to the others, and that are forecast to fit together during the pile up of the trays.

It has been also forecast the possibility that the vertical edges of the tray would be arch and cross-section.

It is also possible that the vertical edges of the tray would present a feather-edge shape.

The bottom of the tray could be provided with inside marquetry rising to the outside, and the support plate could be glue to this rising marquetry covering the entire bottom.

The invention concern also to the manufacturing procedure of this type of trays, consisting of the insertion of the piece design to form the bottom part of the cask, placing the cask over the edge of a shaping piece that has the distance round of the tray that is going to be obtain, immediately incorporating to the mention cask at least one sheet piece shape as a band and with one of it's longitudinal edges glue, that is going to be glue to the outside surface of the marginal flange of the cask, allowing at least one portion of the flange uncovered. This band totally surrounds the bottom until the edges are glue between themselves so the band is place arround the shaping piece forming the side walls of the tray. The procedure ends when the shaping piece is separated from the formed tray.

According to the other preferred realization forecast for the mention tray, this realization presents correspondence with the vertex of it's bottom wide bevels, presenting the marginal flange that determines the cask form for the mention bottom a height considerably higher in these bevels, while the side walls of the tray, that can be obtain from one or more pieces, also present a correspondance with these bevels, folds over themselves that determine on the corners of the tray a remarkable thickness because the resulting three layers of the wall.

According with one difference in the realization of the tray that also uses the compact cardboard as a raw material for it's manufacture, as well as the structuration from various pieces joint between themselves by glue, the structuring of the tray is base on a specific realization on which five pieces take part, one that forms the bottom and the other four form the

side walls, with the special particularity that two of these last ones, set up against each other, present in it's edges elongations as a folding wings from folding cross lines, which end up superpose and glue to the other sides of the tray, covering them totally. The mention sides in second place present elongations with folding wings shape in it's edges, from folding cross lines, which ennd up superpose and glue to the edges of the sides of the tray mention in first place.

The bigger sides of the tray are provided, along the upper edge with flanges bend and glue over the inside surface of the corresponding side. this bigger sides present in it's edges the folding flaps, glue over the outside surface of the smaller side of the tray, covering it totally.

The upper edge of the smaller sides is provide with a rising wings, that are equal in shape and position with the notches provide in the lower edge of the same sides, that can be insert between themselves when piling up the trays, avoiding the movement of the trays when pile up.

The wings that appear from the edges of the smaller sides present in their upper edge a rising wings that correspond with the cuts provide on the bottom of the tray, next to the flanges of this bottom. This wings and cuts fit between themselves when piling up the trays, cooperating on the immobilization.

As well as the bigger sides the small sides of the tray fold down to the level of the bottom of the cask, or what is the same, of the tray as a hole.

According with the above specification, the procedure for the making of this type of tray consist of obtaining by forging the piece that form the bottom of the tray, provide with correspondence with it's edges with other marginal flanges that fold from the folding lines that limit the shape of the bottom, and at the same time by forging, the strips or pieces that must form the the lateral sides or walls of the tray, with it's corresponding edge wings, provide with cross lines to fold. These strips or bands are glue along the flanges of the bottom. Later two of the opposite faces or sides are bend from the folding lines in a raising position, and at the same time the corresponding elongations are bend as wings, by it's folding lines.

Next the other two sides and it's corresponding wings are bend as it was describe before, until the wings of each side are superpose and glue to the adjacent edges of the adjoining sides.

Finally it has been also forecast the possibility that the bands corresponding to the faces of the tray will lightly oversize and provided in it's portion corresponding to the bevels of the corners with a double folding line at a medium level, in a way that the adaptation of these elongations of the sides to the strips of the bigger side walls and corresponding elongations of the same, the mention oversize of the first force them to a inside deformation and consequent separation of the section corresponding to the sec-

and ones, that form one of the hollow columns forecast to facilitate the dovetail joint between trays, during the piling up of the same.

Optionally this oversize of the strips could be considerably greater, so that by a folding of the same over the portion corresponding to the mention hollow columns, these become solid. With this a reinforcement during the pile up of the trays is gain parallel to the guiding effect that has been mention before.

Additionally the bottom of the trays provide as well as the bevels mentioned with wide notch that coincide in size and shape with the section of the hollow columns, which and in it's inside wall present a upper projection, preferably with trapezium isoscelic shape, intended to be place in the notch of the next upper tray, in the pile up between trays.

A important characteristic that is achieved with this invention is the optimization of the printing operation, because it is form by different and independent pieces, that could be printed as the client will and necessities of the tray, meaning that to the printing machine will only be send the pieces of the tray that need to be print, without having to introduce in the printing machine the pieces that do not need to be print.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and to contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1.- Is a diagrammatic side elevation section view, of a piece that form the bottom of the tray and two pieces or bands that will form the side walls of the mention tray, according with the manufacturing procedure that is the subject of this invention.

Figure 2.- Shows, a similar representation of the figure 1, the stage of adjustment of the side strips or bands to the bottom piece.

Figure 3.- Again shows a diagrammatic representation section view similar to the ones of the figure 1 and figure 2, when the tray has been totally form.

Figure 4.- Shows a longitudinal section view of the tray, at the end of it's manufacturing, but still joint to the forming piece over which the assembly is done.

Figure 5.- Shows a longitudinal section view of the two trays pile up.

Figure 6.- Shows a detail in side elevation of two trays, at the moment of being pile up, at sight the complementary notch and wings build on the edges of the side walls, for the side joining between themselves.

Figure 7.- Shows a detail in section of the components of the dovetail joining that appear on the figure 6.

Figure 8.- Shows a perspective view of a tray with round edges and reinforce manufactured by the procedure object of this invention.

Figure 9.- Shows a detail in perspective of a edge of the tray provide in this case with sharp edges.

Figure 10.- Shows a detail in cross section of a tray with a bottom provide with a Insertation determining of a perimetral.

Figure 11.- Shows a diagrammatic view, of the hole piece that will form the bottom of the tray, with bevel edges, and the four pieces that will form the sides of the same.

Figure 12.- Shows a detail in longitudinal section of a edge of the tray form by the componetsof the figure 11, and with a plate to be assembly to the bottom of the tray.

Figure 13.- Shows with a similar representation of the one on the figure 12, the mention plate properly assembly to the bottom.

Figure 14.- Shows a detail in perspective of a tray with the components of the figures 11 to 13.

Figure 15.- Shows a quartering in perspective of a tray with bevel edges, according to a variant of the realization on which the mention edges have been reinforce by a fold of the band that form the side walls of the tray.

Figure 16.- Shows a partial detail of the piece that form the bottom of the tray, at the level of one of ot's corners.

Figure 17.- Shows a partial view of the tray of the figure 15, ones it has been totally assembly.

Figure 18.- Shows a detail in longitudinal section of two tray properly pile up.

Figure 19.- Shows a perspective view of the basic components from which the pile up tray is obtain, according to the realization forecast for this purpose.

Figure 20.- Shows a similar view of the last figure but showing the components glue between themselves.

Figure 21.- Shows a perspective of a first glueing stage of the two smaller sides of the tray of the figures 19 and 20.

Figure 22.- Represents the final stage of the manufacturing process of the tray, ones the respectives sides and flaps are fold and glue.

Figure 23.- Shows a detail in section of the plane V of the figure 22 at a bigger scale.

Figure 24.- Shows a detail in section of two trays according to the plane VI of the figure 22, just before of being pile up.

Figure 25.- Shows a similar view of the one in figure 24, showing the trays already pile up.

Figure 26.- Finally shows, a detail in section by the plane A-B of the figure 22, showing two trays pile up.

Figure 27.- Shows a quartering in perspective of a pile up tray manufactured according to one variant of realization modify with respect to the figures 19 to 26.

Figure 28.- Shows the set of pieces of the last figure properly assemble, also according to a perspec-

tive view.

Figure 29.- Shows the set of pieces from the last figure but during the intermediate stage of the manufacturing process.

Figure 30.- Shows, according to a perspective view also, the tray at the final stage of the process.

Figure 31.- Shows a enlarge detail of one of the corners of the tray of the figures 27 to 30.

Figure 32.- Shows a detail in section of two trays pile up. Also at the level of one of it's vertex and according with the cutting line A-B of the figure 30.

Figure 33.- Shows a detail in perspective of one of the corners of the box, similar to the one of the figure 31, but according with the variant of realization on which the the column form in the mentioned corner is solid.

Figure 34.- Finally shows a detail in cross section of the set represented on the last figure according to the cutting line C-D of the mention figure.

PREFERRED EMBODIMENT OF THE INVENTION

The pile up tray that the invention suggest, according to the version represented on the figures 1 to 14, a portion of a piece (1), made of cardboard or any other similar material, previously form as a cask with very small depth, with a flange (2), bend all around.

Furthermore of this piece there where previously form two bands (3) (could only one or more than two), made of cardboard or any other similar material to which, optionally, support strips are glue (4) that, ones the tray is build, the vertical edges of the tray (5) will occupy, and tha could be round (figure 8) or of sharp edge (figure 9).

The bottom (1) is assemble to a edge (6a) of a forming device (6), whose shape match with the shape of the cask. Next the band or bands (3) are apply to the surround of the forming device, with the edges (3a) and the extremities (3b) previously glue to the flange (2) and the extremities (3b) are glue between themselves, so the bands (3) enclose totally the forming device (8) and form the side walls of the tray (5) (figure 1 to 5).

Depending if the forming device (6) has the edges round, bevel or sharp edged, the tray will have it's edges of one type or the other.

On figure 11 of the drawings a diagrammatic representation of the prior stage of the manufacturing process of a tray from a bottom (1) and four bands (3) whose extremities (3b) will be superpose when manufacturing the tray (figures 12 to 14), to reinforce the vertical edges of the tray.

In the case that there is only one tray (3), the procedure will be almost the same, so that the single band will surround totally the forming device (6) and it's extremities will joint between themselves.

Once the bands (3) are glue to the flange (2) of the bottom (1), the next step is to separate the form-

ing device (6) and to extract the tray (5) already form.

According to this process of manufacturing it is possible to obtain different types of tray as a function of the special characteristics of the bands (3) and of the bottom (1).

In the case that the edge of the lower extremity (3a) of the bands (3) is continous (figures 4, 5, 8), these will be place separately of the bottom (1), that overhang lightly respect to the edge of the extremity (3a). So when piling up two trays (5) (figure 5), the upper edge (3c) of the bands (3) is assemble around of the overhanging portion of the flange (2) of the bottom (1) and lays against the edge of the extremity (3a).

It has been forecast that the lower edge (3a) of the bands (3) present notchs (7) and the upper edge (3c) present wings (8) of a complementary shape to the notchs (figures 6 and 7). When piling up two trays (5), the wings (8) of the lower tray assemble on the notch (7) of the upper tray.

It has been also forecast that the cask (1) that form the bottom of the tray (5), present projections (9) insert and rising to the outside (figure 10), in order to provide of grater resistance to the bottom part. It is possible to add to these projections a support base plate (10).

According with the variant of the realization shown on figures 15 to 18, and for the obtaining of a tray (5) with it's vertical edges bevel, similar to the one represented on figures 11 to 14, it has been forecast that the bottom of the box won't be form by one piece form with cask shape, but instead by a sheet body in which a central sector (1), corresponding to the bottom of the box, basically rectangular shaped, with it's vertex bevel, from whose edges surface the wings (2) and (2a) by glueing and with the correspondence to the side wall of the cask earlier form and previously mention, with the particularity in this case that the wings (2a) corresponding to the bevel edges of the corners are substantially oversize with respect to the remaining wings (2).

Complementary the side walls of the tray are obtain by one band (3e) that is fix to the wings (2) and (2a) by glue and in correpondece with the bevel of the corners, it has folds (4a) that determine a triple wall fot these bevel areas of the vertical edges of the box, with the consequent and remarkable development that gives to the resistance and stiffness to the compression of the tray, specially when piling it up.

AS to the rest and as in the previous case, the pile up of the trays is carried out assembling the rising part of the bottom of one tray with the respect to the side wall (3e) of the same tray, in the entrance of the tray immediately below, as is seen especifically on figure 18, so the lower marginal edge (10) of the side wall (3e) of the box, lays perfectly over the upper edge (10a) of the side wall (3e) of the box or tray immediately below in the pile up.

According with a variant in the realization show on figures 19 to 26, the tray is obtain from a cardboard plate (11), of rectangular shape, with folding lines (12) and (13), parallel and next to the sides of the plate, that define a folding flanges (14) and (15) place around the plate (11), that will form the bottom of the tray to be build.

In the angles of the plate (11) there are foldings wings (12a).

The sides of the tray are form from two strips (16) of cardboard, that constitute the two bigger sides and another two strips (17) that form the two smaller sides.

The bigger sides (16) present along their upper edges, longitudinal flanges (18) bend and glue over the inner surface, with it's extremities (18a) bevel cut.

As well as the sides (16) as the (17) present folding lines (19) with transversal way, that define the wings (20) on the sides (16) and (17). The wings (20) are bigger than the wings (21), and between each pair they have the same length as the smaller sides (17).

The manufacturing procedure consist of glueing the lower edge of the faces (16) in the flanges (14) and of the sides (17) in the flanges (15) (figure 20). Once this set is form the next step consist of folding the smaller sides (17) and it's wings (21) (figure 21). Next the bigger sides (16) are fold and then the wings (20), glueing the wings (21) on the inner surface of the edge of the sides (16) and the wings (20) over the outside surface of the sides (17), which are totally cover (figure 22).

The glue of the wings could be done previously to the described operations, by using Thermoactive glue, or as well during the performance of the operations.

The manufacturing process describe is very simple, outstanding the the process is carried out from five pieces of cardboard: The plate (11), two sides (16) and two sides (17). This allows to obtain the plate (11) with a different thickness of the sides (16) and (17), in function of the resistance that must support. Also allows the realization of the printing process of the sides (16) and (17) in a easier way than over the known trays, because allows the introduction of single strips, easy to handle, instead of the entire plate, as it happens with prior realizations, that present alot of difficulties for it's handling.

To what relates to the configuration of the obtain trays, recall that the smaller sides (17) and it's wings (21) present in it's upper edge a rising wings (22) and (22a) respectively. On the lower edge of the mention sides there are notch (23) complementary in position and shape with the mention wings.

Furthermore, the bottom (11) of the cask presents next to it's corners openings (24) whose position correspond with the position of the wings (22a) of the wings (21).

Thanks to this disposition when piling up the trays, the wings (22) assemble in the notch (23) and the wings (22a) in the openings (24) with the purpose of immobilize the trays pile up (figures 24, 25 and 26).

It must be outline that the notch (23) stay in a hide position, because the faces (17) are place between the wings (20) by one side and the flanges (15) by the other side. This avoids that the wings assemble with the notch could leave the pile up positioning.

On the figure 24 can be observed how the extremity (18a) the flange (18), the extremity of the flange (14) and the extremity of the wing (21) assemble, all of them glue over the inner surface of the sides (16). Thanks to this disposition, the bigger sides (16) are reinforce by the describe components.

About the smaller sides (17), they are doubly reinforce by the flanges (15) and the wings (20).

Definitively, the trays obtain present characteristics of resistance to efforts and compresions that allow to pile them up one they are loaded, without danger of being deform.

Finally and according to one variant of the realization of the tray, the one represented on figures 27 to 32, the bottom (11) of the cask presents next to it's corners various recess (25) of considerable size, while the wings (21) in their section corresponding to the two folding lines (19) that limit the section corresponding to the mention bevel, other two folding intermediate lines (26), parallel to the last ones, and between themselves a upper elongation (27) and a lower notch and complementary (28), being also this section of the elongations (21) comprise between the folding lines (19) lightly oversize in it's wide with respect to section also corresponding to the bevel of the wings or elongations (20) limited by the folding lines (19) similar to the object that in the forming of the box and as it is seen specially on the figure 31, in the areas of the bevels are define hollow columns, whose section coincide with the shape and size of the notch (25) that are found in the cask or bottom (11) of the same, so that in the pile up between boxes and because at the same time it is seen in the section of the figure 32, the upper elongations (27) of the opening of each box, go across the notch (25) of the box immediately above, until reaching the top of the notch (28) of the stiffness columns of the this last one, what makes easier considerably the handling of the pile up because it generates a self-centering positioning between the boxes or trays.

Optionally the section of the strips (17) comprise between the folding lines (21), could be considerably more oversize and affected by the plurality of fold (29) that, as is seen on the figures 33 and 34, transform the mention columns of the vertical edges of the box in solid elements, what means, parallel to the guiding effect mention, a remarkable stiffness of the tray structure at the level of the vertical edges, that improves the piling up conditions of the tray.

It has also been forecast the existence in each of these fold (29) of a double bevel edge in its upper extremity, determinant for each of the folds of a angle supplement (30) and, for the column as a hole, of a "sharpening" that makes easier the handling of the pile up of the tray.

About the smaller sides (17), they are doubly reinforced by the flanges (15) and by the wings (20).

The advantages that the procedure of the invention and the trays obtain with it are the following:

- Simplification in the manufacturing process, respect to the usual process on which the start begins with forging plates, with folding lines that must be bend, assembling or glueing flanges, wings or any other components.
- This simplification also affects to the way by which the means of assemblage by superposition are obtain, much more simple than of the trays obtain by the other known process.
- Greater resistance to the compression, specially in the case that the trays present arch vertical edges. This resistance can be increase by joining the strips (4) glue to the inner side or outside of the edges of the tray, the fold (4a), or to the columns (9-15).
- Thanks to the arch vertical edges or bevel it is possible to avoid hits and rubbing while handling the trays.
- A lower cost of the tray because it is possible to obtain the bottom (1) of a specific quality and the walls (3, 14 and 15) of a greater quality, with the purpose of printing in its outside surface. In the trays form by one single piece, all of it is made of the same material.
- The printing of the side walls (3, 14 and 15), of the tray is easier and cheaper respect to the printing of the sides of the trays of a single piece, because is much easier to handle with the bands (3, 14 and 15) that a piece of greater size, as is the case of the known trays.
- The possibility of reinforcing the bottom of the tray by marquetry (figure 10).

Claims

1.- Pile up tray for the transportation of goods, specially for perishable goods as fruit and vegetables, characterize by being form from two or more pieces, of compact cardboard, one forming a kind of cask (1), (11) determining the bottom of the tray and of the marginal flange (2), (14), and the remaining that form the side wall (3), (16), (17) of the mention tray, with the special particularity that the piece or pieces (3), (16), (17) that form the side wall of the tray are fix outside to the marginal flange (2), (14) of the cask or bottom piece (1), been forecast the use of raw materials of different weight for the different pieces of the tray,

in order to provide to the tray with the level of stiffness appropriate for each one of its different pieces.

2.- Tray, as in claim 1, characterize because is form from five pieces, fix between themselves by glue, one forming the bottom (11) of the tray and the other four of the walls greater and smaller, presenting two of these last ones, forming opposite sides (16), elongations in its ends with a folding wings (20) shape, from cross lines (19) of folding, which are superpose and glue to the others two sides of the tray, covering them totally, presenting these sides (17) mention in second place a elongations (21) with shape of folding wings in its ends, coming from transversal lines (19) of folding, which are superpose and glue to the extremity of the sides (16) of the tray mention in first place.

3.- Tray, as in claim 1 and 2 characterize because the side walls (16) and (17) of the same present their lower edge touching with the bottom (11) of the tray.

4.- Tray, as in claims 1 to 3, characterize by the fact that the bigger sides (16) are provide, along the upper edge, with bend flanges (18) and glue over the inner surface of the corresponding side, being these bigger sides the ones that present in their extremities the folding flaps (20), glue over the outside surface of the smaller sides (17) of the tray, to which are totally cover.

5.- Tray, as in claims 1 to 4, characterize by the fact that the upper edged of the smaller sides (17) is provide of a rising wings (22), that are of the same shape and position than the notch (23) forecast in the lower edge of the same sides, that fit between when piling up the trays.

6.- Tray, as in claims 1 to 5, characterize by the fact that the wings (21) that extend in the extremities of the smaller sides (17) present in their upper edge a rising wings (22a) corresponding in relation to cuts (24) forecast in the bottom of the tray, next to the flanges of the same.

7.- Manufacturing procedure of pile up trays for the transportation of goods, as in the above claims, characterize because consist in forming the bottom (11) of the tray, provide of the edges of other marginal flanges (14-15), folding from the folding lines that limit the shape of the bottom, while that its sides of the tray are form by other strips (16,17) provided of elongations like folding wings (20,21), from a transversal folding lines, whose strips are place along the flanges of the bottom; Then two of the opposite sides are bend (17) from the folding lines (13) to place them in a stright position and, at the same time the other two sides (16) are bend and their respectives wings (20) the same way describe above until superpose and then each wing is glue to each side of the adjacent edges of the adjoining sides.

8.- Tray, as in claims 1 to 5 and 7, characterize because the cask (11) that form the bottom of the tray and in correpondence with the bevel of the corners, is

provided with wide recess (25), at the same time that the wings (21) elongations of the strips (17) corresponding to the sides, Present their initiating section comprise between the folding lines (19) lightly over-size with respect to the section corresponding with the wings (20) elongation of the strips (18) corresponding with the bigger side walls of the tray or box, being forecast that the mention folding lines (19), incorporate other two folding intermediate lines (26), together with a upper elongation (27), preferably with isosceles trapezium shape, all of it in a way that the joining between themselves of the mention strips and at the level of the bevel of the corner of the tray, are define hollow columns, preferably of isosceles trapezium shape, filling with the recess (25) of the bottom of the tray, recess across of which go through the upper elongations (27) of the columns of the box immediately below, in the pile up between trays, with the particularity that the convergent configuration towards it's end free of such elongations (27) helps the assemblage and guidance in the recess (25) and consequently, the piling up of the trays.

9.- Tray, as in claim 8, characterize because the section of the strips (17) comprise between the folding lines (21) a plurality of folds are define (29), that transform the mention hollow columns in solid columns, Also with a considerably isosceles trapezium shape section, with the special particularity that the upper extremity of the mention folds (29) is affected by the double bevels (30) determining of a upper "sharp" end for each column, that helps even more the assemblage in the corresponding recess (14) of the bottom of the tray immediately above, in the piling up of the trays.

10.- Pile up tray for the transportation of goods, essentially characterize by been form from two or more single pieces, of compact cardboard, joint between themselves by glue, one of them, the one corresponding to the bottom of the tray, is form as a cask (1), provided of a marginal flange (2), directed upward, piece that forms the bottom of the tray and to whose flange (2) is fix, by one of it's longitudinal edges (3a), at least one band (3) that form the sides or side walls of the tray (5), whose band (3) leaves uncovered a portion of the flange (2), all of it in a way that the mention cask (1) stays inside of the piece or pieces (3) that form the side walls of the tray, at the same time that overhang with respect to the lower edge (3a) of the mention side walls, so in the piling up between trays the bottom cask of each of them penetrates partially in the opening of the tray immediately below.

11.- Tray, as in claim 10, characterize by the fact that the walls of the same are form by two bands (3) complementary, similar, glue to the outside side of the flange (2) rising from the bottom.

12.- Tray, as in claim 10, characterize by the fact that the bands (3) that form the sides of the tray are superpose to each other forming support areas in the

corners of the tray.

13.- Tray, as in claim 10, characterize by the fact that the bands (3) that form the sides of the tray present in the lower edge notches (7), and in the upper edge wings (8) rising and in the same plane with respect to the notches, whose notches and wings are complementary between themselves and assemble with the ones of the other tray when they are pile up.

14.- Tray, as in claim 10, characterize by the fact that the transversal section of the vertical edges of the same is of a arched and wide shape.

15.- Tray, as in claim 10, characterize by the fact that the vertical edges of the same present a bevel.

16.- Tray, as in claim 10, characterize by the fact that the bottom of the same is provided with rising marquetry (9) to the outside to which a support plate (10) is glue, and that cover the entire bottom.

17.- Tray, as in claim 10, characterize by the fact that the vertical edges present various support strips.

18.- Tray, as in claim 10, characterize because the piece or pieces (3) that form the side walls have folding flanges (3) over it's inner side and fixables to the same by glue, to increase the mechanic resistance of the tray.

19.- Tray, as in claim 10, characterize because the different pieces that form the same have equal or different thickness in order to increase the resistance of the tray where needed.

20.- Manufacturing process of the pile up trays for the transportation of goods, as in claims 10 to 19, characterize because from a variable number of pieces of similar, stiff material, specifically compact cardboard, the first piece (1) is form by insertion, with cask shape, with a fold all around it with form of a flange (2) marginal and rising, whose piece will form the bottom of the tray; the piece that will form the bottom of the tray, the piece with cask shape is place assemble in the extremity of the forming device (6) that has the shape of the tray that is going to be obtain; next at least another piece with band shape (3) is incorporate to the cask mention, with one of the longitudinal edges with glue, that is glue to the outside surface of the flange (2), leaving uncovered, at least one portion of the mention flange, which band enclose totally the bottom until the extremities are glue between themselves in a way that the band is assemble around of the forming device forming the sides of the tray, finishing the procedure once the forming device is separated from the tray (5).

21.- Procedure as in claim 20, characterize by the fact that to the flange of the bottom (1) of the tray two or more bands are incorporated (3), similar that enclose, each of them, one portion of the shape of the bottom (1), the edges (3b) of which bands are glue to totally close the mention shape, so the same are assemble around of the forming device (6) and form the side walls of the tray.

22.- Procedure, as in claim 20 to 22, characterize

by the fact that the cask (1) that forms the bottom of the tray has been treat to a insertion process, that determine the formation of projections (9) of reinforcement in the outside face of the same.

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24.- Procedure, as in claims 20 to 23, characterize by the fact that the projections of the bottom (1) of the tray, stick to a supporting plate that cover the entire bottom.

25.- Procedure as in claim 20, characterize by the fact that, before the incorporation of the bands (3) to the bottom (1) of the tray (5) these were glue to a reinforcing laminate strips (4), place transversally with relation to the bands that acupy the vertical edges of the formed tray.

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26.- Procedure, as in claims 20 to 25, characterize because prior to the formation of the pieces that form the tray a silkscre printing is done over the pieces that will carry the ornamental motive and/or the information, so that the mention silkscreen printing is done over single pieces.

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27.- Tray, as in claim 1, characterize because the bottom cask (1) present it's vertex (2) bevel and it's flanges (3) and (4) is common to the side wall (5) of the tray, arranged by a single piece or vorious pieces. with the particularity that the mention side wall present with correspondance with the mention bevels, fold over itself, fix by glue, which form spaces that are reinforce by a multiple wall, to which the flanges (4) are also fix by glue of the cask (1) place in the bevel (2), that present a greater height that the remaining flanges of the cask.

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28.- Tray, as in claim 27, characterize because the bottom cask (1) is obtain by forging.

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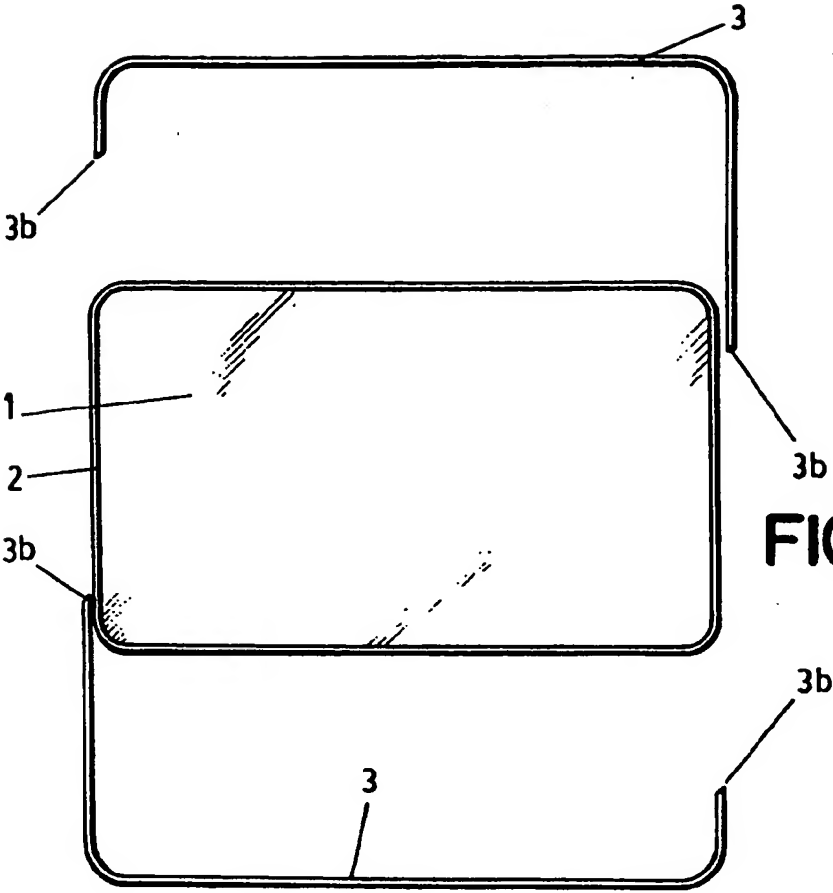


FIG.-1

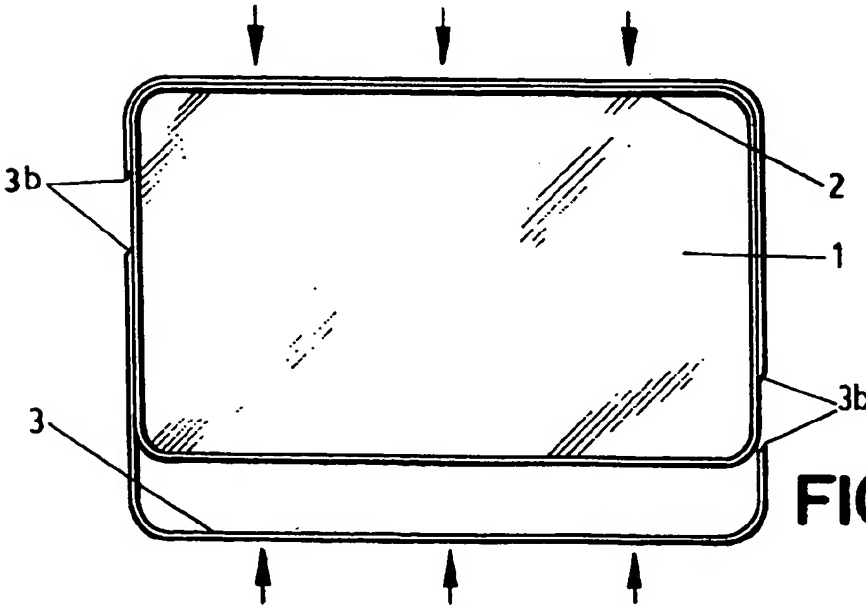
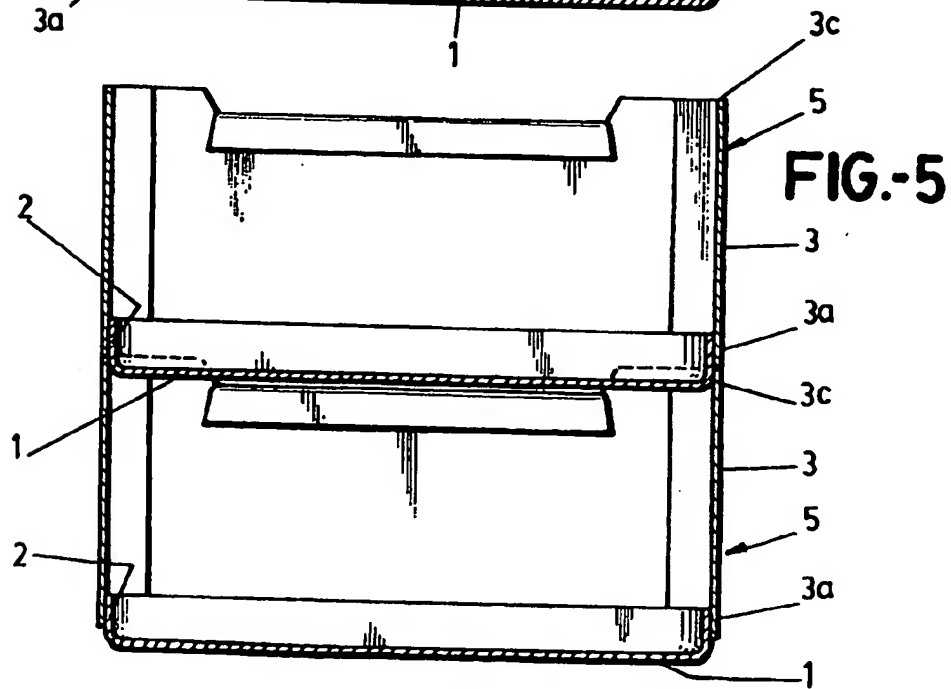
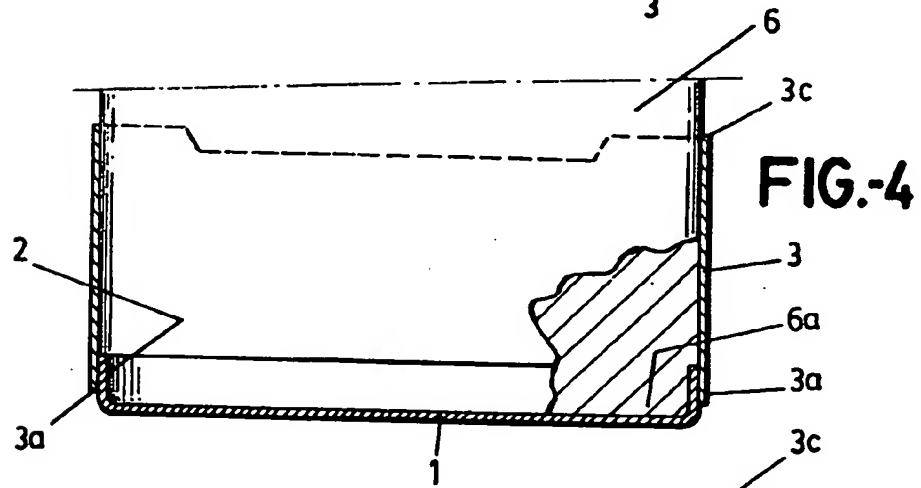
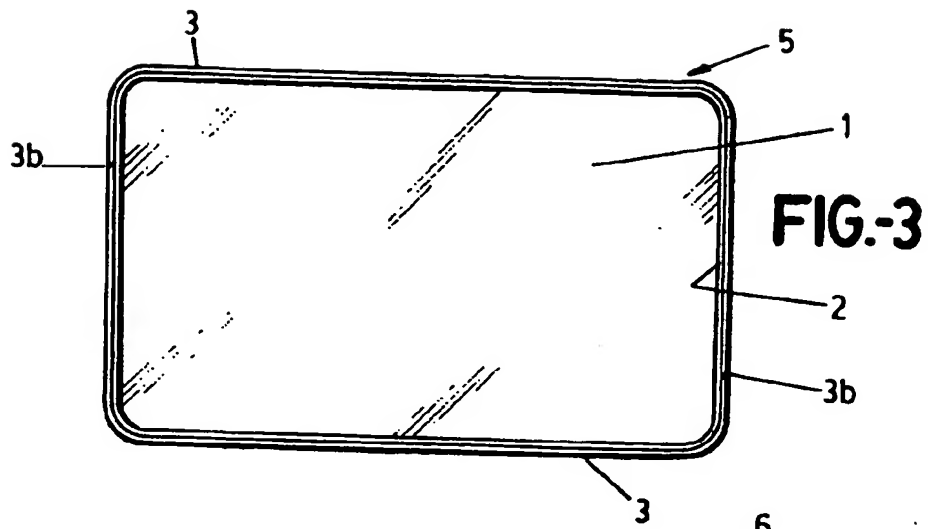


FIG.-2



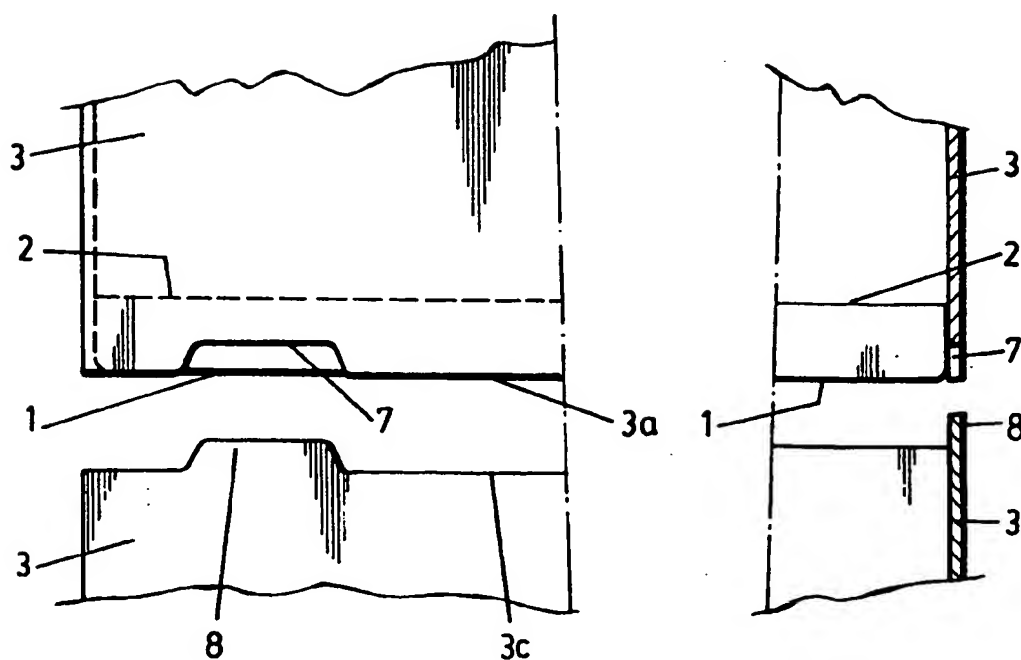


FIG.-6

FIG.-7

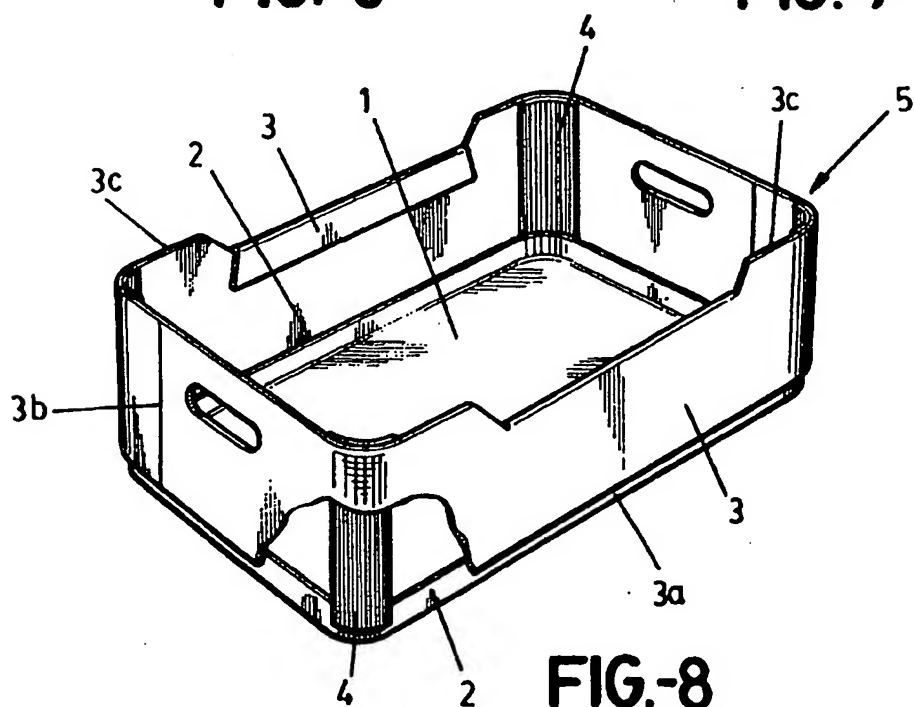


FIG.-8

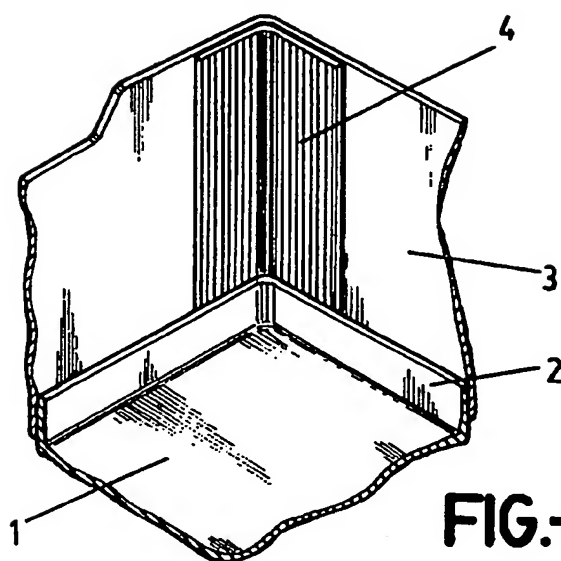


FIG-9

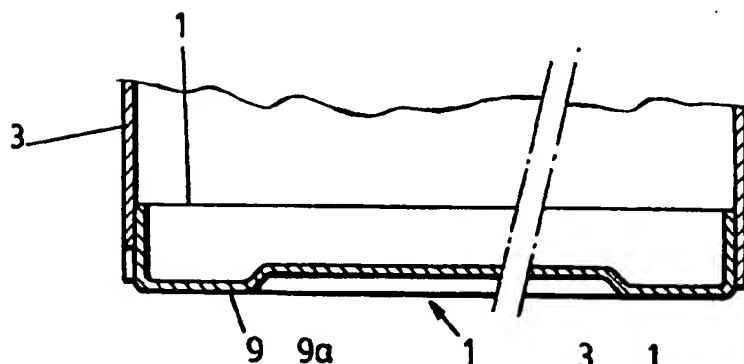


FIG-10

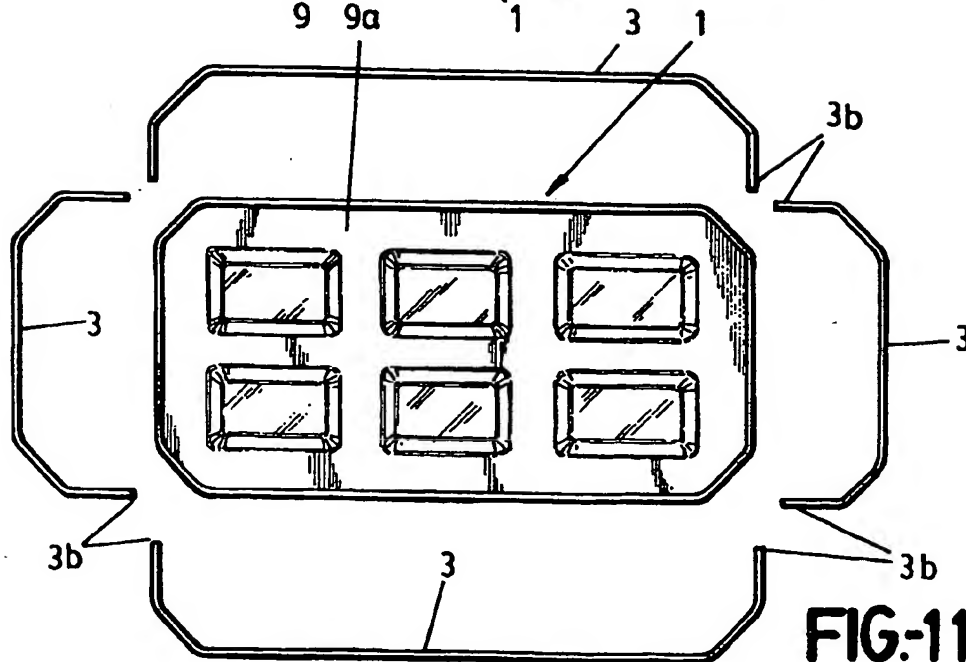


FIG-11

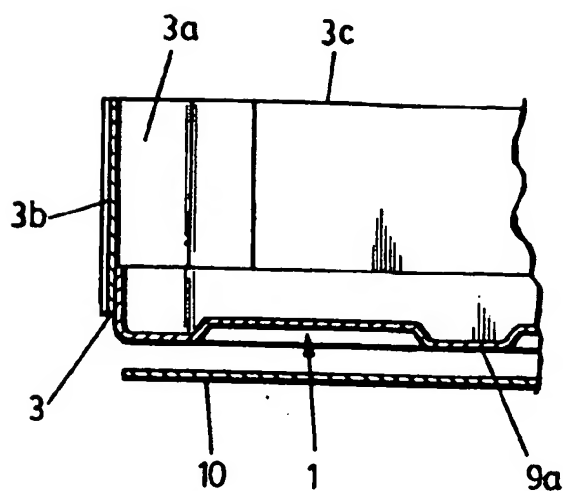


FIG.-12

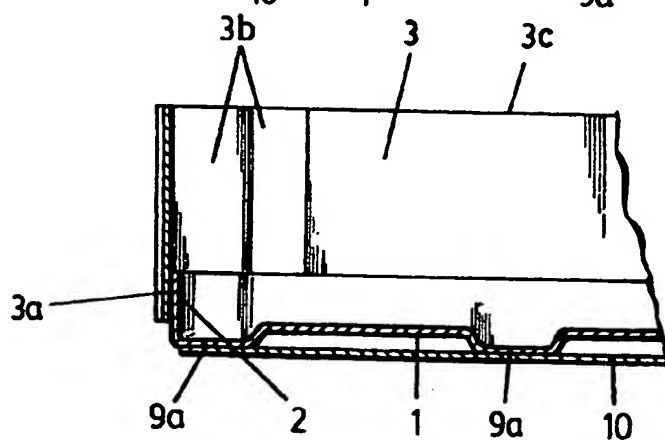


FIG.-13

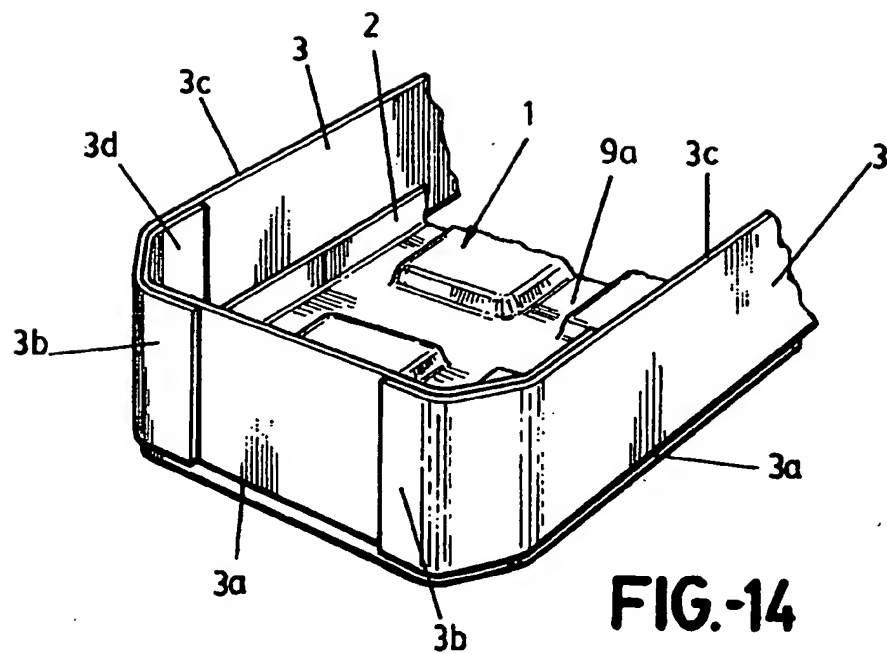


FIG.-14

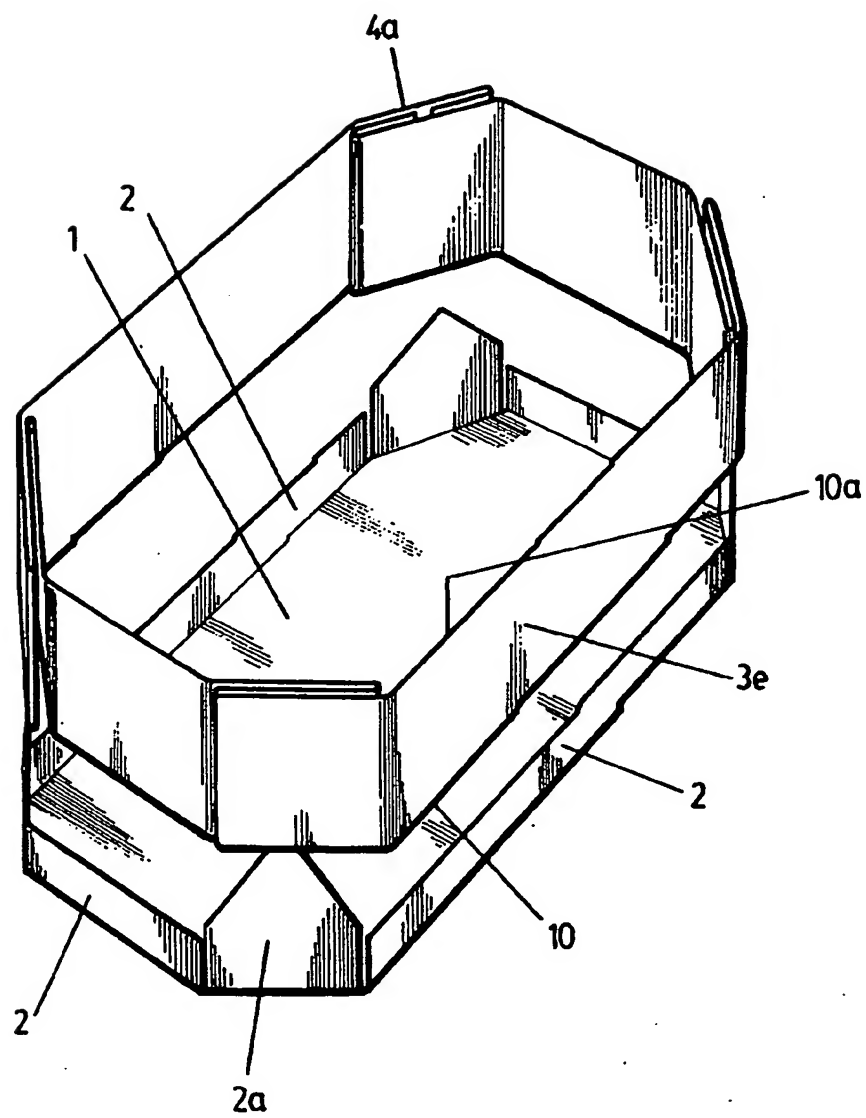


FIG.-15

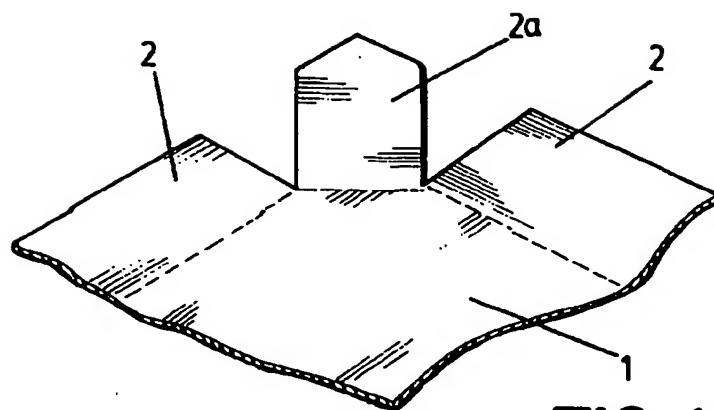


FIG.-16

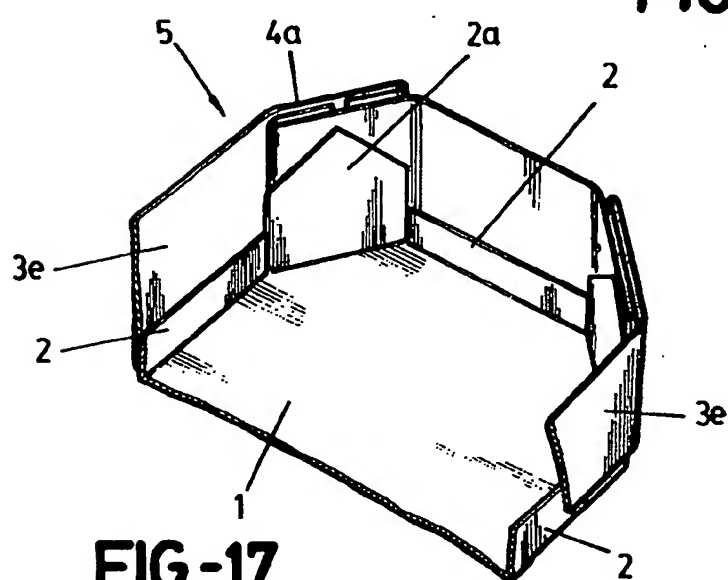


FIG.-17

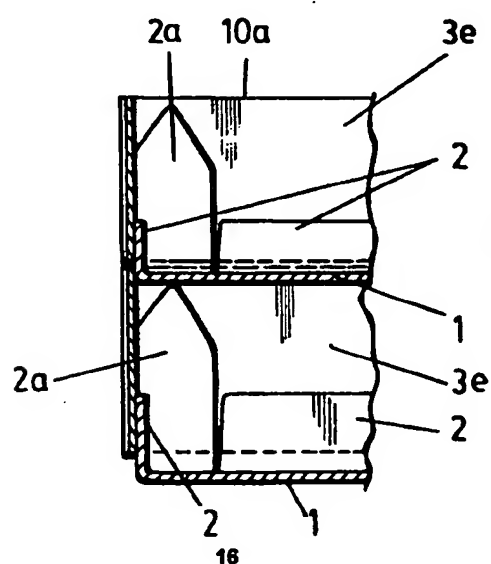


FIG.-18

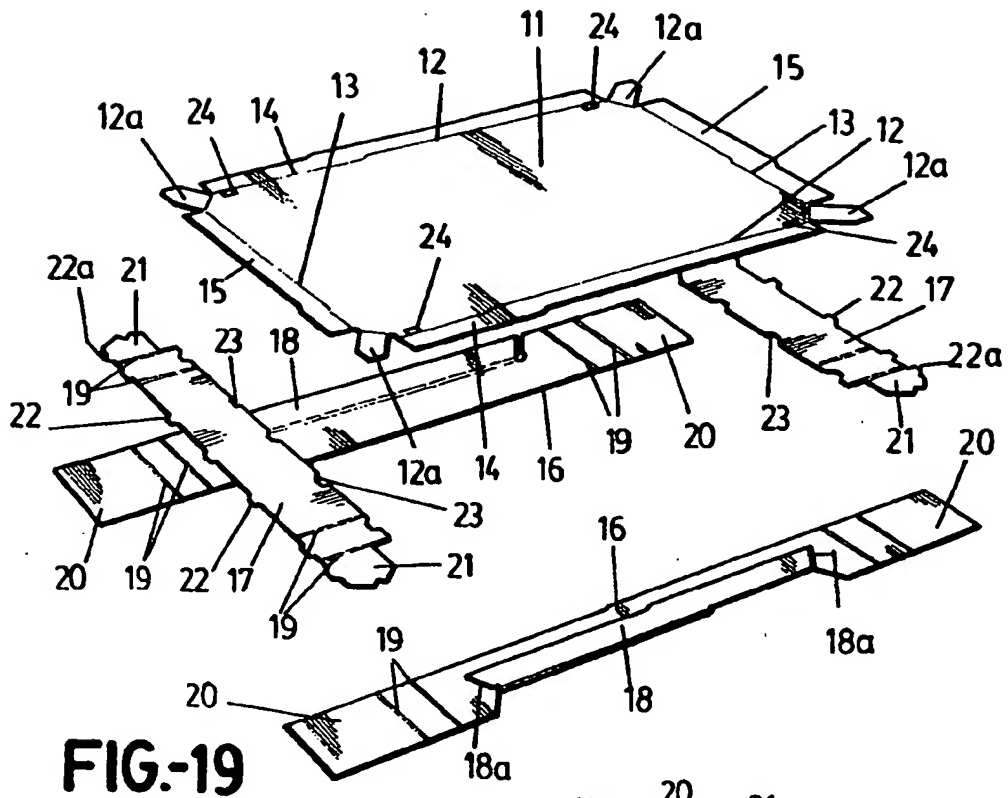


FIG-19

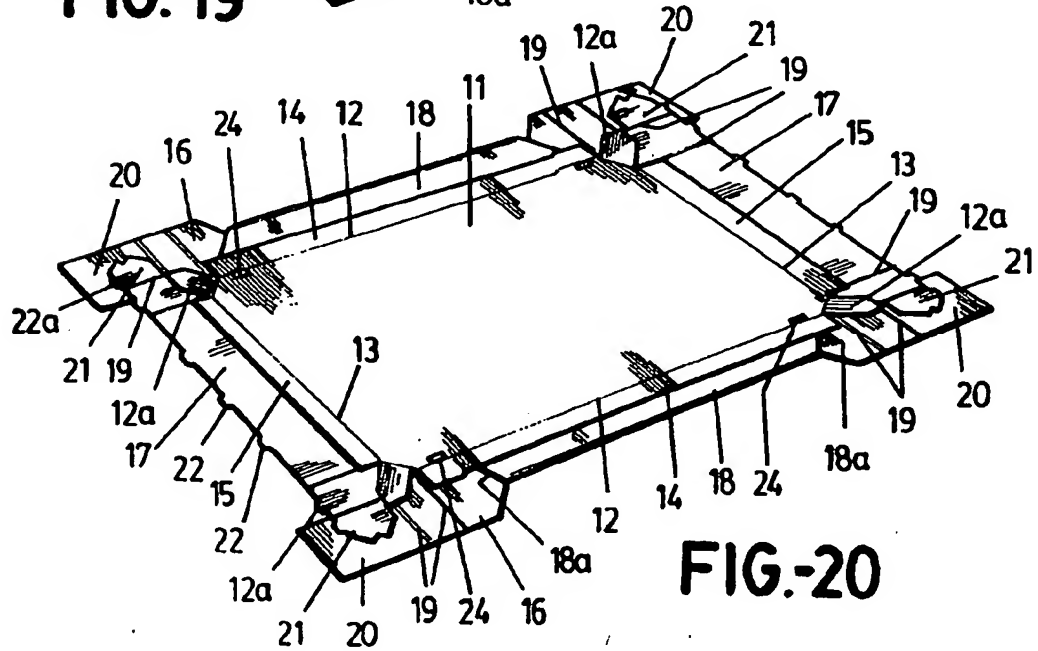


FIG-20

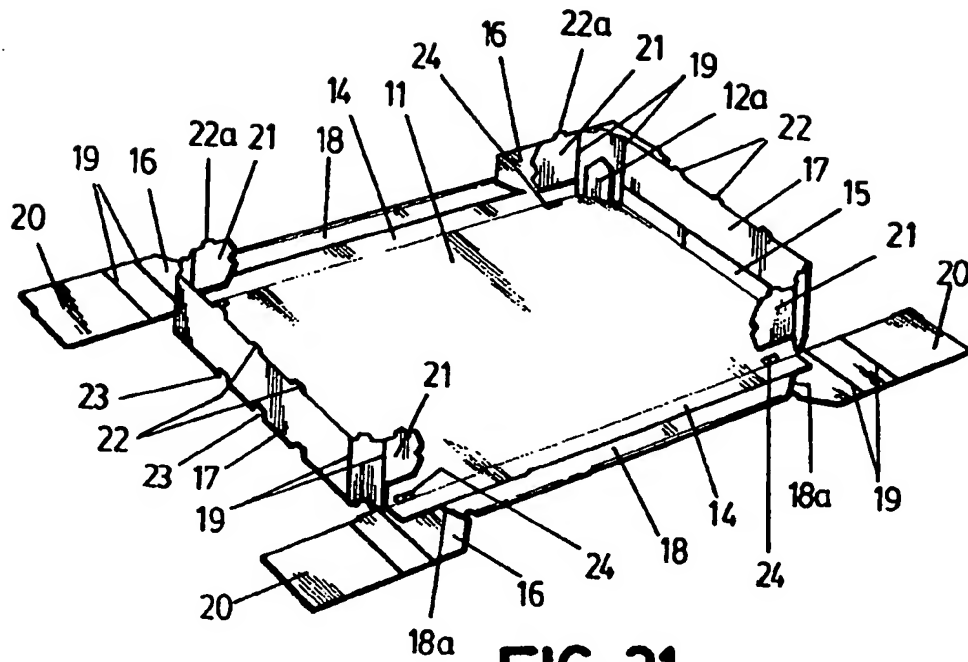


FIG.-21

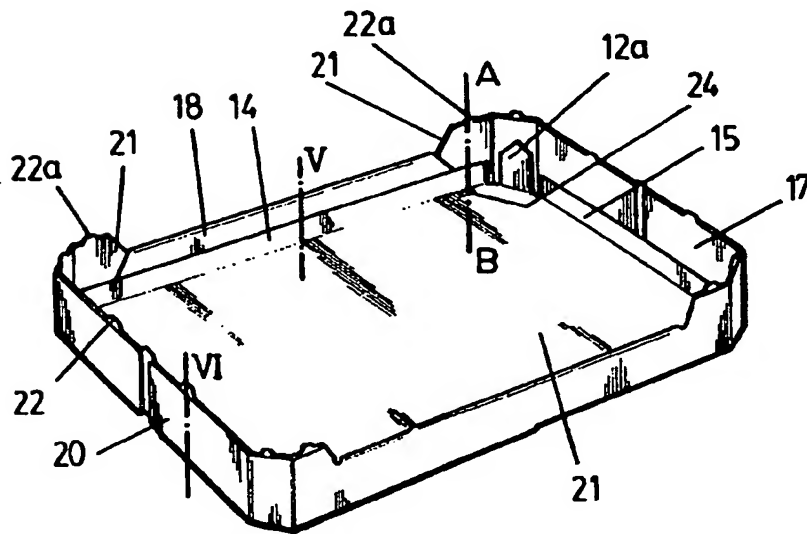
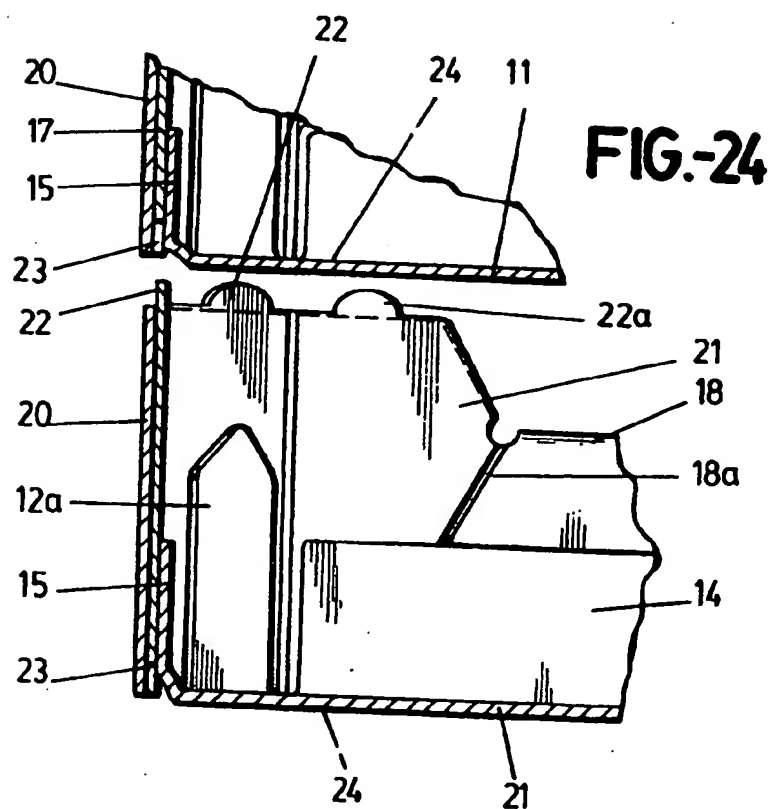
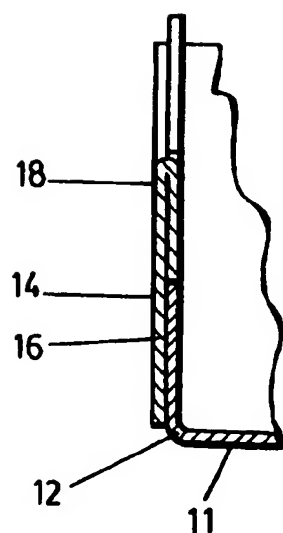
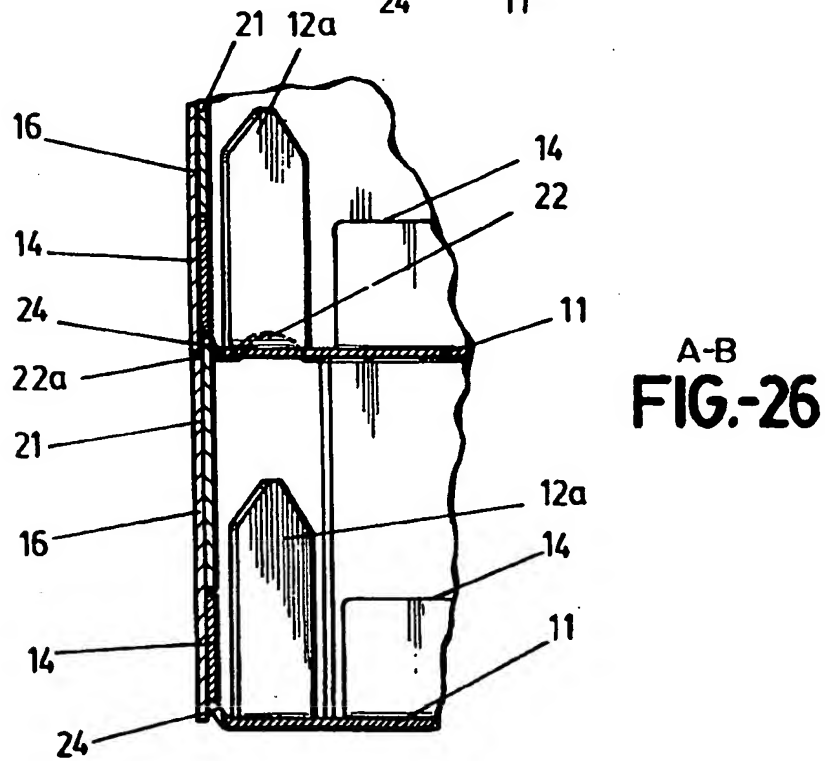
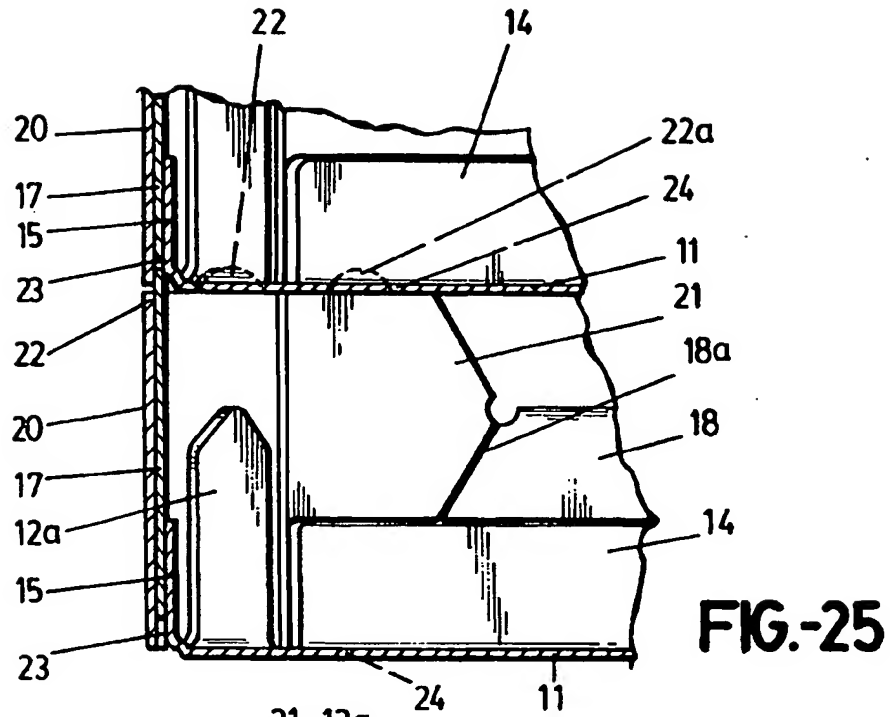


FIG.-22





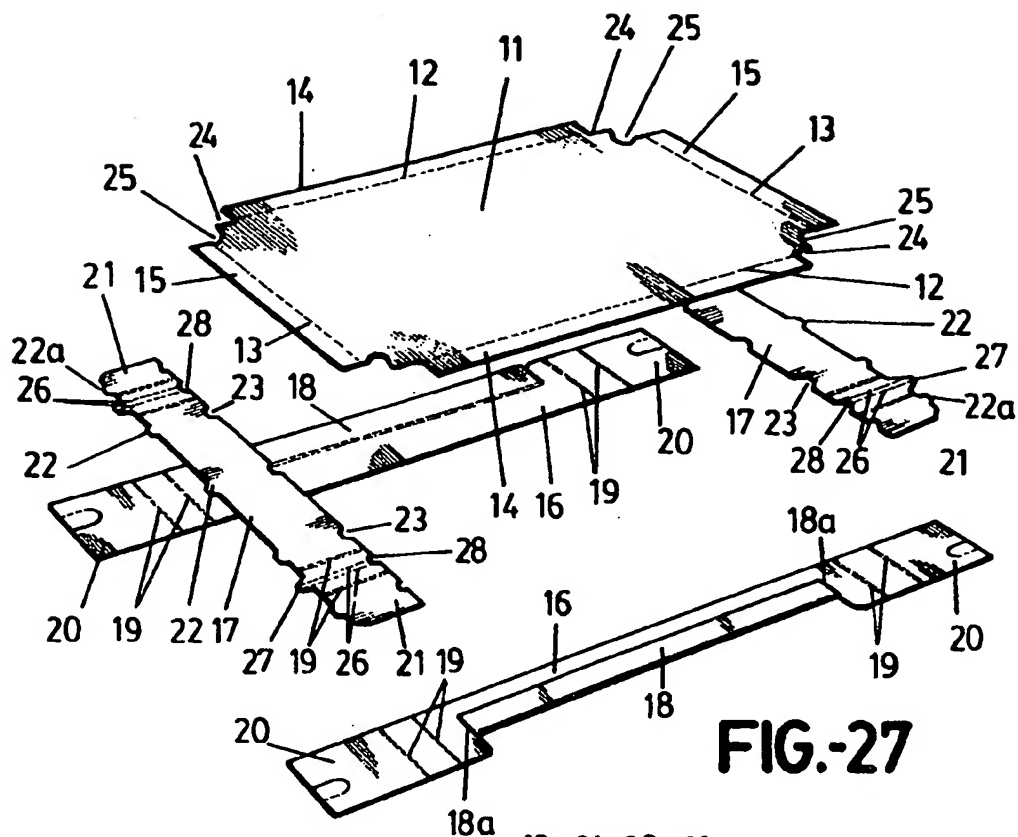


FIG.-27

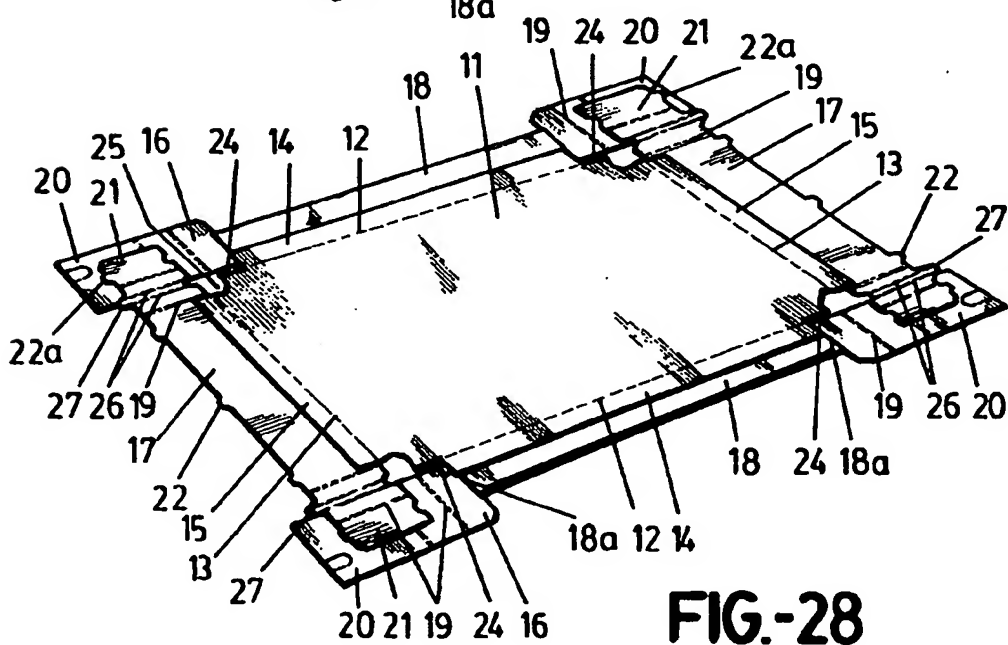


FIG.-28

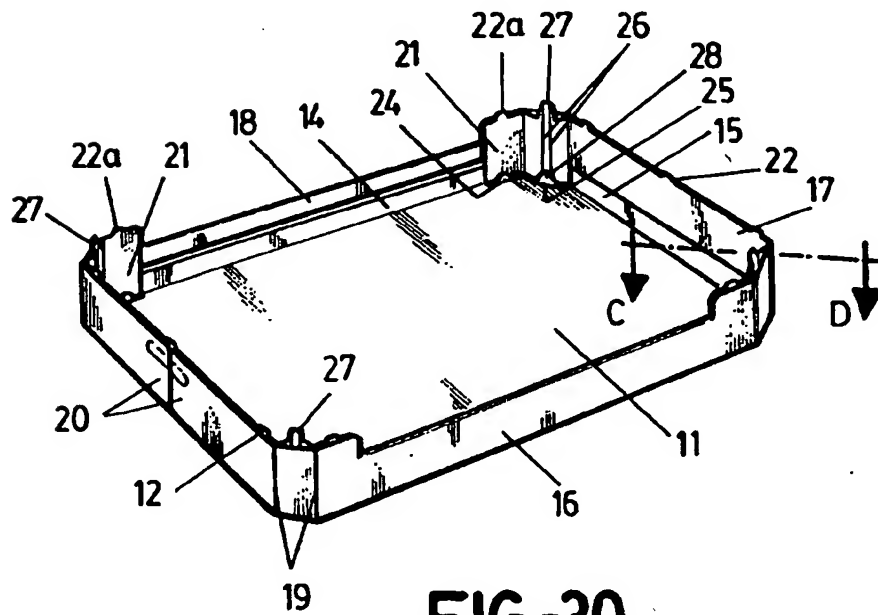
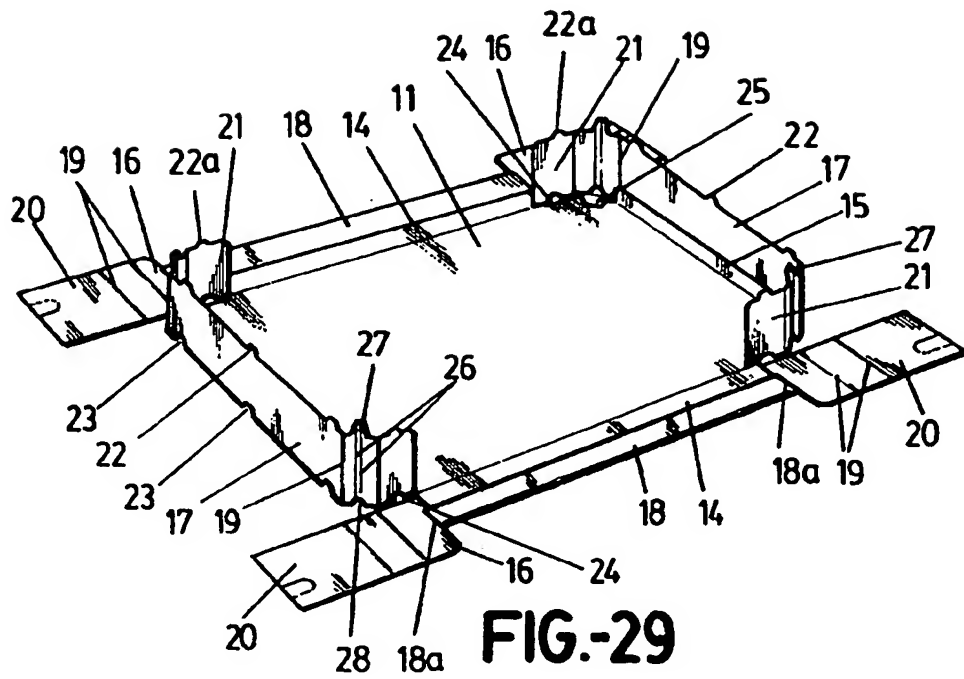


FIG.-30

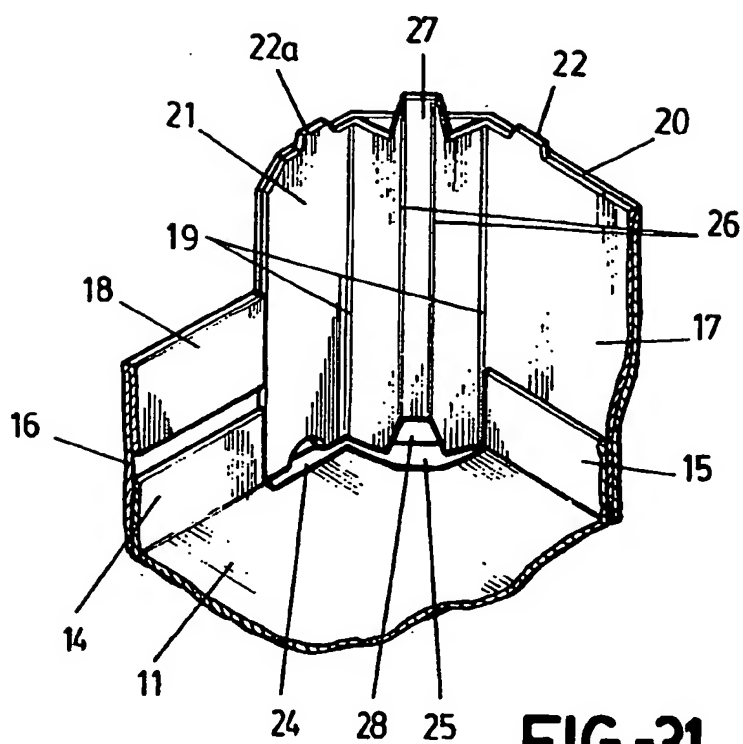


FIG.-31

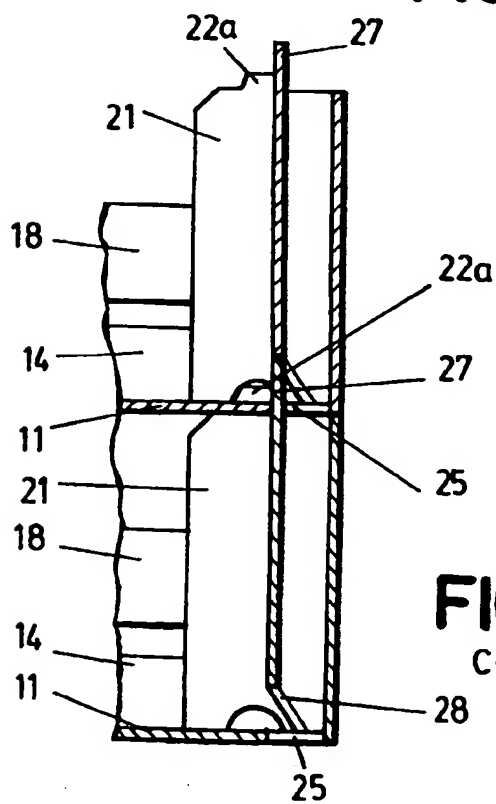


FIG.-32

C-D

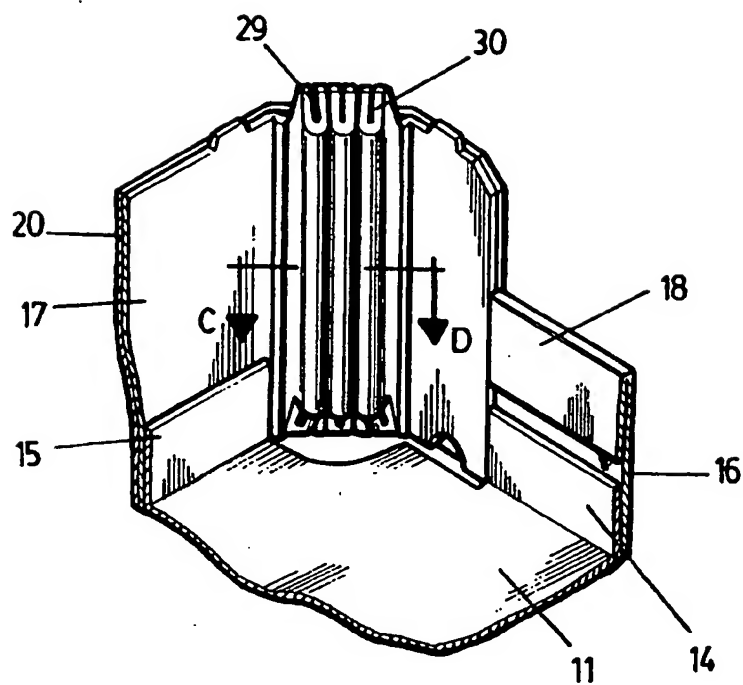


FIG.-33

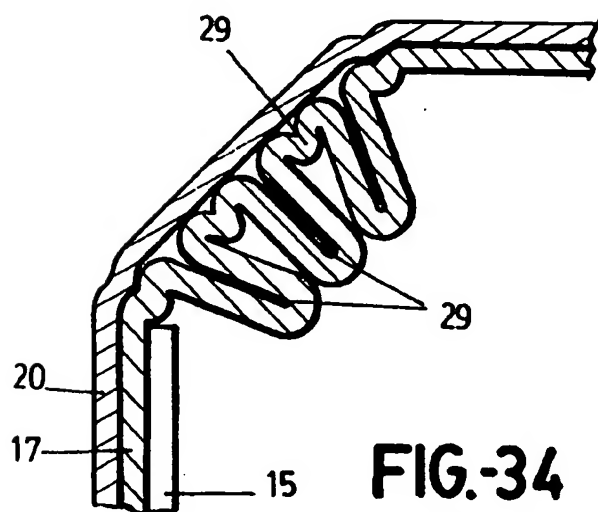


FIG.-34
C-D



European Patent
Office

PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention
shall be considered, for the purposes of subsequent
proceedings, as the European search report

EP 93 50 0073

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
X A	US-A-3 931 923 (THURSTON) * the whole document *	1,3 10,18,19	B65D5/32 B65D5/44 B65D21/02
X A	FR-A-2 047 161 (HEPATEX) * the whole document *	1,3	
A	FR-A-836 645 (GIACOBBI) * the whole document *	1-4,7, 10,12	
A	GB-A-783 801 (GOUGH AND MARTIN) * the whole document *	1,2,4,5, 7	
A	US-A-4 105 153 (LOCKE) * the whole document *	1,8,27	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
			B65D B31F

INCOMPLETE SEARCH

The Search Division considers that the present European patent application does not comply with
the provisions of the European Patent Convention to such an extent that it is not possible to carry
out a meaningful search into the state of the art on the basis of some of the claims

Claims searched completely:

Claims searched incompletely:

Claims not searched:

Reason for the limitation of the search:

see sheet C

Place of search
THE HAGUE

Date of completion of the search
09 SEPTEMBER 1993

Searcher
LEONG C.Y.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another
document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or
after the filing date
D : document cited in the application
L : document cited for other reasons

Δ : member of the same patent family, corresponding
document

EPF FORM 150 (11/91) (P. 1/2)



EP 93 50 0073

-C-

INCOMPLETE SEARCH

Claims searched completely: 1-13,18-28

Claims not searched: 14,15,17

LACK OF READY COMPREHENSIBILITY

(19)



Europäisches Patentamt
European Patent Office
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(11) Publication number:

0 485 032 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 91202852.9

(51) Int. CL⁵: B65D 5/00, B65D 5/36

(22) Date of filing: 05.11.91

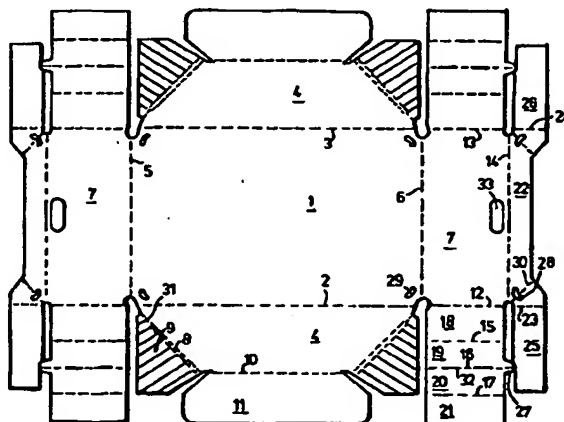
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AT BE CH DE DK ES FR GB GR IT LI LU NL SE(71) Applicant: SMURFIT LONA VERPAKKING B.V.
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(54) Stackable cardboard package with reinforced corners.

(57) A stackable packaging has corner-reinforcing members, comprising a box provided with a cardboard bottom (1) as well as cardboard side and end panels (4, 7), said end panels (7) of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge (22) that is parallel to the bottom (1) in the erected condition of the packaging and covers the corner-reinforcing members, said bridge (22) of the blank being connected to two bridge strips (25, 26) that are fixed in the erected condition of the packaging to a side panel (4) as well as to one side (18) of the four sides of the corner-

reinforcing member, while another side (21) of each corner-reinforcing member is connected to a related end panel (7), said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines. According to the invention the other two sides (19, 20) of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action in between the sides (18, 21) of the corner-reinforcing members, which are connected to the end panels (7) and the bridge strips (25, 26).



EP 0 485 032 A1

The invention relates to a stackable packaging having corner-reinforcing members, comprising a box provided with a cardboard bottom as well as cardboard side and end panels, said end panels of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge that is parallel to the bottom in the erected condition of the packaging and covers the corner-reinforcing members, said bridge of the blank being connected to two bridge strips that are fixed in the erected condition of the packaging to a side panel as well as to one side of the four sides of the corner-reinforcing member, while another side of each corner-reinforcing member is fixed to a related end panel, said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines.

Such packagings should be able to replace the familiar wooden tomato crates, provided they are made of a foldable material adapted to the three-days' stay within a so-called moist cold store with a through-flow cooling system. A more or less obvious material comprises a water-repellent grey cardboard of a density of 900 g/m² that is provided at both sides with a sheet of polyethylene of 15 g/m² in between layers of paper of 40 g/m². This material appears to fail to give the box of the above type adequate stability, which is illustrated by the fact that the end panels are not perpendicular to the bottom.

In applying the invention to packagings of about 38 x 29 x 14 cm, the usual dimensions for packaging roughly 6 kilograms of tomatoes, the packaging should have a compression resistance of at least 490 kg after having stayed for three days within a moist cold store with a through-flow cooling system. The above three days are connected with the weekend, and in this respect 'moist' implies a relative humidity level of around 90% at a temperature of ca. 13° C.

Packagings meeting the above-mentioned requirements do exist indeed, yet they can only be used in automatic folding machines which are only profitable when used at large market gardens.

The invention aims to provide a cardboard packaging which is both easy to erect manually and is suitable for packaging tomatoes and similar products, if made of a suitable material. According to the invention this aim is realized by the measure that the other two sides of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action substantially in between the sides of the corner-reinforcing members, which are connected to the end panels and the bridge strips.

If the bridges are provided with apertures, through which locking cams arranged at the edge of the corner-reinforcing members facing away from the bottom can pass in the erected condition of the packaging, then it can be guaranteed that the contents of the box will be diminished as little as possible by those members. Besides, all sides of the corner-reinforcing members will be arranged at those sections of the packaging which are put under the maximum load.

If the height of the locking cams suffices for being accommodated in corresponding apertures within the bottom of a superposed packaging, no longer shifts can occur among the superposed packagings, which is of major importance during transport.

Preferably, the locking cams have an axis of symmetry that coincides with the foldline between the oversized sides of the corner-reinforcing members. Thus, the cams are made rigid.

If the recesses in at least the bridges are circular-segment-shaped and have semi-circular ends, those apertures would tear in the least possible way.

The invention will be explained below into detail referring to the drawing, wherein by way of illustration a blank for producing a packaging according to the invention is represented. It is noted that in the description of this blank the term "above" is used, yet what is meant is "above the plane of the drawing". If the term "below" is used, it is just the other way round.

The represented blank comprises a bottom 1, which is connected to two side panels 4 via foldlines 2 and 3, as well as to two end panels 7 via foldlines 5 and 6. Two foldlines 8 are provided in the side panels 4 at an angle of 45°, largely bounding triangular flaps 9 which are to be folded upwards through an angle of 180°, and a foldline 10 extending parallel to the foldlines 2 and 3 which forms the boundary of a side edge reinforcing strip 11 that is to be folded through 180° during the production, so that it will be arranged eventually at the inside of the packaging. There are some details concerning the members 8-11 which are of minor significance to the invention, and consequently they will not be discussed in this context.

Instead, details concerning the right end panel will be mentioned; and needless to say, the same would apply to the left end panel.

End panel 7 is bounded by both foldline 6 and two vertical foldlines 12, 13, as well as one horizontal foldline 14. The foldlines 12 and 13 of the blank are in line with the foldlines 2 and 3 of the bottom. Beyond the vertical foldlines 12 and 13, four sides 18-21 of the intended corner-reinforcing members are arranged which are connected to one another by foldlines 15-17. Beyond the horizontal foldline

14, a bridge 22 is arranged, the right boundary of which will be arranged adjacent to the vertical centre line of the bottom 1 after having been folded together with the end panel 7 along foldline 6 through 180°.

Bridge 22 also has two foldlines 23 and 24 which provide a pliable connection to two bridge strips 25 and 26, said bridge strips 25 eventually being arranged in between and fixed to, for example by means of an adhesive, the outer surface of side 18 and - after folding - to the inner surface of flap 9.

So far the sides 19 and 20 have not been folded yet along their mutual folding line; which will not be the case until the packaging is erected, the sides 18-21 initially forming a more or less square post, as side 21 is connected to end wall 7. Yet, after the box has been erected, sides 19 and 20 will be displaced under snap action, so that the foldline 16 will be arranged nearer to the vertical foldlines 12 and 13. The oversized condition of the sides 19 and 20, the total of their widths in particular, in relation to an imaginary, diagonal joint line connecting the foldlines 15 and 17, enables the snap action and results in very rigid corner-reinforcing members in the final state of the box, said corner-reinforcing members being very well adapted, in particular, to resist forces which are mainly exerted horizontally and act on the corners of the box from the outside and being able to support a load of high-stacked packagings.

Each of the corner-reinforcing members 18-21 are provided with a locking cam 27 having a symmetry axis coinciding with the foldline 16 between the overdimensioned sides 19 and 20. In this way, the locking cams are more rigid than if they would have been just flat.

The bridges 22 are provided with apertures 28 which are arranged in the angular sections of the bridges which are bounded by the foldlines 14 and 23, 24. After the packaging has been erected and the sides 19, 20 are displaced under snap action, the locking cams 27 project into or through said apertures. They project into them when their height only slightly exceeds the thickness of the bridge 22, and they project through them when they are only a little larger than about twice the thickness of the bridge. In the latter case, they are to be accommodated in corresponding apertures 29 in the four corners of the bottom 1 of a packaging put on top of the bridges.

The apertures 28 and 29 may be shaped like a slit or a triangle, yet a circular-segment shape with semi-circular ends is preferred, as that shape has the least chance of tearing.

The above-described packaging can be produced by means of automatic machines. After punching the blank and applying the foldlines into

it, at first the sides 21 are fixed (adhered) to end panels 7, so that they will be adjacent to the sides 18. After that the side-panel-reinforcing strips 11 are folded along foldline 10 through 180°, abutting against the upper surface of the side panels 4, and fixed (adhered) to it, and the flaps 9 are folded along foldlines 8 through 180° so that they abut against the lower surface of the side panels 4, and subsequently the members 4, 9 and 11 are folded together along foldlines 2 and 3 through 180° so as to abut against the upper surface of the bottom 1.

Subsequently the bridges 22 are folded upwards along the foldlines 14 through 90°, after which the bridge strips 25 and 26 are folded along the foldlines 23 and 24 in such a way that, after the folding of the members 7, 18-22 through 180°, said bridge strips 25 and 26 will be arranged between the sides 18 and the flaps 9 and fixed (adhered) to them. In this procedure the bridges 22 are folded along foldlines 30 extending radially through the apertures 28 at an angle of 45°.

Naturally, the corner-reinforcing members could also be formed after the erection of the side panels 4 yet prior to folding the end panels 7.

When the box is in a folded state, the extremities of the bridges 22 of the blank are positioned near to the vertical centre line of the blank.

To facilitate the production and erection of the packaging some foldlines are provided with incisions for part of their length. This applies to the foldlines 8 of the illustrated example near the intended lower corners; indicated by 31, as well as to the foldlines 16, indicated by the bold line sections 32.

Into the end panels 7 apertures 33, which are known per se, are applied in order to allow fingers to grip when handling the packagings.

Within the scope of the claims also other embodiments could be selected than the one illustrated in the drawing.

Claims

1. Stackable packaging having corner-reinforcing members, comprising a box provided with a cardboard bottom (1) as well as cardboard side and end panels (4, 7), said end panels (4) of the blank being provided with two four-sided posts for reinforcing the corners of the packaging in the erected condition of the packaging, and a bridge (22) that is parallel to the bottom (1) in the erected condition of the packaging and covers the corner-reinforcing members, said bridge (22) of the blank being connected to two bridge strips (25, 26) that are fixed in the erected condition of the packaging to a side panel (4) as well as to one side (18) of

the four sides of the corner-reinforcing member, while another side (21) of each corner-reinforcing member is connected to a related end panel (7), said bottom, panels, bridges and strips being connected to one another or separated from one another by foldlines, characterized in that the other two sides (19, 20) of the corner-reinforcing members are oversized, so that in the erected condition of the packaging they will be arranged by snap action substantially in between the sides (18, 21) of the corner-reinforcing members, which are connected to the end panels (7) and the bridge strips (25).

2. Packaging according to claim 1, characterized in that the bridges (22) are provided with apertures (28) through which locking cams (27) arranged at the edge of the corner-reinforcing members facing away from the bottom can pass in the erected condition of the packaging.

3. Packaging according to claim 1 or 2, characterized in that the height of the locking cams (27) suffices for being accommodated in corresponding apertures (29) within the bottom (1) of a superposed packaging when stacking packagings.

4. Packaging according to claim 3, characterized in that the locking cams (27) have axes of symmetry that coincide with the foldlines (16) between the oversized sides (19, 20) of the corner-reinforcing members.

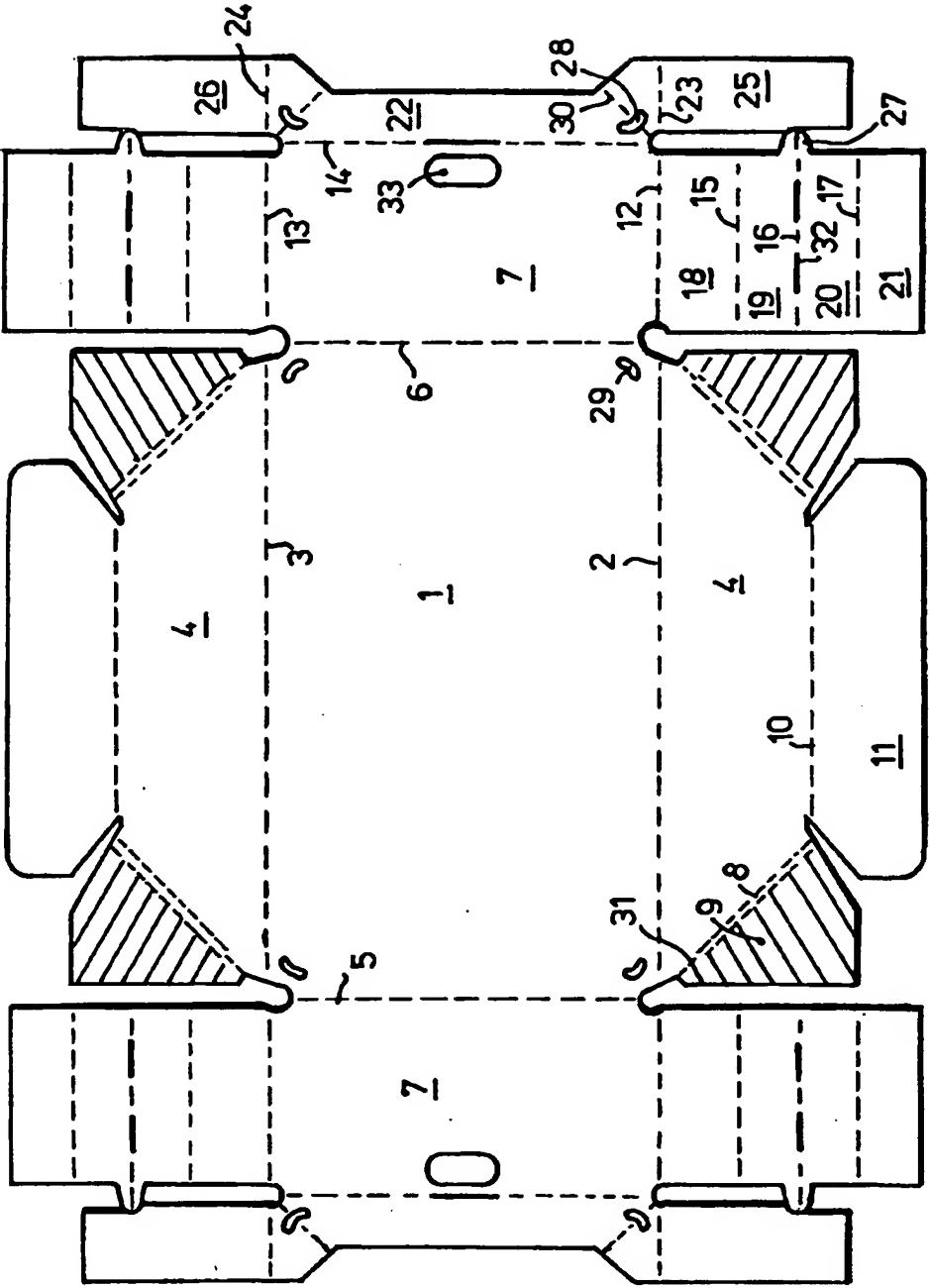
5. Packaging according to any of the preceding claims, characterized in that the apertures (28, 29) in at least the bridges are circular-segment-shaped and have semi-circular ends.

6. Packaging according to any of the preceding claims, characterized in that the side panels (4) and the bridges (22) are provided with foldlines (8, 30) to present the packaging as a prepared box.

7. Packaging according to any of the preceding claims, characterized in that it is made of a water-repellent, grey cardboard having a density of nearly 900 g/m², at least one side of which is coated with a sheet of polyethylene in between layers of paper, so that along with the layers of glue a density exceeding 1100 g/m² is obtained.

8. Packaging according to any of the preceding claims, characterized in that at least the foldlines (16) between the oversized sections (19, 20) are provided with incisions (32).

9. Packaging and blank as illustrated in the drawing and/or described with reference thereto.





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 91 20 2852

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,P	EP-A-0 453 015 (BUHRMANN-TETTERODE) * column 8, line 1 - column 9, line 38; figures 5-7 *	1,6	B6505/00 B6505/36
Y	EP-A-0 394 544 (G. HOFFMANN GMBH)	1-4,6	
A	* column 2, line 35 - column 3, line 41; figures 1-6 *	3,4	
Y	GB-A-2 196 608 (REED PACKAGING)	1-4,6	
	* page 1, line 107 - line 113; figures 1-4 *		
Y	FR-A-2 548 626 (CASTILLO)	2-4	
	* page 2, line 5 - line 18; figures 1,2 *		
A	EP-A-0 394 549 (G. HOFFMANN GMBH)	1-4,6	
	* column 2, line 50 - column 3, line 18 *		
	* column 4, line 16 - line 21; figures 1-7 *		
A	US-A-4 056 223 (WILLIAMS)		
A	NL-A-9 000 063 (KARTONFABRIEK "GELRIJ")		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B650
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		05 FEBRUARY 1992	BERRINGTON
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure F : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : number of the same patent family, corresponding document	

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